MEMORY-BASED SHUFFLE-EXCHANGE TRACEBACK FOR GIGABIT ETHERNET TRANSCEIVER

ABSTRACT OF THE DISCLOSURE

A decoder having a memory structure which receives and stores potential symbols, with each of the potential symbols having a unique pointer associated therewith. One of the potential symbols is a most likely symbol. The most likely symbol is selected using a pointer selector which processes the unique pointers according to a predetermined selection operation and selects the most likely pointer which, in turn, is uniquely associated with the most likely symbol. The most likely pointer then is used to produce the most likely symbol. The pointer selector is a shuffle exchange network and the predetermined selection operation is a shuffle-exchange operation. The decoder can be used in systems that conform to IEEE Standard 802.3ab, e.g., gigabit Ethernet systems. The potential symbols are four-dimensional, 12-bit symbols having eight symbol states. The memory structure and pointer selector can be constituent of a maximum likelihood decoder, for example a trellis decoder, more specifically a Viterbi decoder. One such pointer selector is a shuffle exchange network which selects the most likely pointer using a shuffle exchange operation upon the unique pointers and not the potential symbols, as with previous architectures and methods.